SECOND SERIES VOL. VIII, No. 10

BULLETIN

OF

THE NEW YORK ACADEMY OF MEDICINE

INCORPORATED 1851

OCTOBER, 1932

PUBLISHED MONTHLY BY

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2 East 103 Street

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EDITORIAL

MEDICAL GEOGRAPHY AND GEOGRAPHIC MEDICINE[1]

"Die Geomedizin muss erst geboren werden"
Heinz Zeiss.

Silly Billy, confronted by the Siamese Twins, put the pyramidal query: "Brothers, I suppose?" But the distinction between medical geography and geographic medicine (geomedicine) is something more than a distinction without a difference. With regard to the unattainable ideal of world-control of disease, it opens up lines of thought which may be of considerable moment for the medicine and sanitation of the future. Medical geography deals with the relation of climate and environment to disease and its distribution in space within any given period of time. The aim of geomedicine would be to map out not only the distribution and peculiarities of disease, but also the status of medicine and sanitation over given areas of space, within the same time-interval. In like manner, medical history accounts for the progression of medicine over different areas in space through successive periods of time; historical medicine for phases of this development within any definitive space-area and time-interval. Medical geography is, therefore, that phase of political geography which accounts for the diseases of different countries or regions of the earth and their peculiarities, as influenced by such local conditions as soil, water-supply, climate,

[1]Read, in part, to the historical group of the Medical School, Yale University, New Haven, on June 21, 1932.

meteorology, flora, fauna, entomology, ethnology and so on. Geomedicine implies the cartography or topography of disease and of the temporal status of medicine and sanitation within the same global areas. It had no existence in the past and its whole concern is with the possibility of a concerted, world-wide organization of medicine in the future. For historical purposes, therefore, geomedicine is the science of the distribution of medicine in space, supplementing medical history, the record of the progression of medicine in time. Medical history is a lineal, geomedicine what Henry James once termed a "lateral demonstration."[2]

Medical geography began with its basic text, the Airs, Waters and Places of Hippocrates, which is incidentally the first important excursus into anthropology, ethnography and climatology. At the very beginning of this tract, Hippocrates urges physicians entering an unknown locality to inquire into its climate, water-supply, prevailing winds, seasons, and native population, with reference to current diseases and their seasonal impact. As he develops his theme, he discusses in succession the diseases of Thessaly and Thrace, the ethnic peculiarities of Egyptians, Persians and Scythians and the effects of climate and environment upon the political and military spirit of liberty-loving Europeans and the subjects of the Oriental despotisms. The handling of the material is scientific throughout, the basic theme is further expanded in the treatise on Epidemic Diseases and the two tracts have long since taken their place among the major classics of medical literature, with few competitors in sight for great stretches of time. Apart from the stray observations of travellers, medical geography was destined to be merged into epidemiology for many centuries, with nothing to its credit comparable with the descriptions of the plague of Athens by Thucydides and Lucretius or the observations

[2]The expression was employed by the novelist to describe the abrupt transition of a large-sized lady from one seat in a drawing room to another, or, shall we say, the attempted ingress of a broad girl through a narrow doorway.

of Baillou and Sydenham. The first formal contribution to medical geography was, in fact, the three-volume treatise of Leonhard Ludwig Finke (1792-95), which is a good example of the pragmatic method of the 18th Century systematists. Finke blocks out the scope, aims and methods of medical geography with Germanic thoroughness and has even some notion of the effect of environment upon the development of medicine; but in the assemblage of data for the execution of his effective plan, he has naturally very little to go upon. Apart from such rare estrays as Lionel Chalmers on the diseases of South Carolina (1788) or Cleghorn on the diseases of Minorca (1809), there was nothing else of consequence up to the middle of the 19th Century, when Daniel Drake's two volumes on the Diseases of the Interior Valley of North America (1850-54) made a mile-stone of progress. This work is in the great Hippocratic tradition, and was, in its time, the most important contribution to medical geography after Airs, Waters and Places. In assembling his data, which cover the climate, meteorology, botany, zoology, ethnography and prevailing diseases of this vast area, Drake followed the peripatetic plan, travelling all over the Mississippi Valley at his own expense. His work was easily the most important American contribution to medicine in its period, next to the introduction of ether anæsthesia (1847), and was so regarded by Hirsch, Billings, Stillé and Osler, who planned to deliver a "Mississippi Valley oration" on the significance of Drake. The disease-areas which Drake triangulated are now among the healthiest in the world; the anomalous communicable fevers he described have disappeared. When we consider how much the early settlement of the Middle West was impeded by the transmission of these diseases, the relation of their disappearance to contemporary advance in sanitation is of the very essence of geomedicine.

With the appearance of the great three-volume treatise of August Hirsch (1817-94), medical geography came into its own. This work covers the distribution of diseases

all over the world in a most exhaustive way for the time in which it was written, and represents years of patient labor, not duplicated in any of the subsequent treatises on geographical pathology by Clemow, Davidson and others. Even at this time of day, it is still a standard source of reference, set off by such intensive studies of the geographical distribution of particular diseases as those of Laveran on paludism and trypanosomiasis, Zambaco Pasha on leprosy, Loeffler on diphtheria, the Rockefeller survey of hookworm infection or Sticker on plague, cholera, influenza and dengue. An anecdote, perhaps *ben trovato,* will illustrate the method and application of Hirsch. It appears that the old fellow was fond of relaxing with his boon companions around the *Stammtisch,* indeed, like Shenstone's traveller, was fain to "find his warmest welcome at an inn." At stated intervals, his wife would appear to prompt him, with uplifted forefinger: *August, mein August, du hast deine zwei Stunden noch nicht gearbeitet!*

It is in the nature of things that most of the data of medical geography should be static, applicable mainly to the period of time in which they were made. Two interesting contributions to the dynamic phase of geomedicine, dealing with the mobilization of disease over definite areas and within definite periods of time, are the studies of Dr. W. H. Gantt on the changes in impact and distribution of disease in Russia following the Revolution and famine, and of Col. Percy M. Ashburn on the effect of disease on the settlement of the North American Continent.

Gantt found that the social upheavals and economic misery of 1917-22 produced a complete *bouleversement* of ordinary pathological conditions in Russia, so that gout, diabetes, obesity and other digestive or metabolic disorders due to repletion disappeared, while hunger-œdema, cachexia, scurvy, typhous fever, gastro-intestinal irritation, polyneuritis and other disorders associated with starvation or vitamin-deficiency appeared in full force. At the same time, malarial fever was carried all over Russia, from the Arctic Ocean to the Crimea, by the mosquito; cholera, influenza, typhus, smallpox and other communicable diseases swept the great plain with the devastating impact of mediæval epidemics; and while venery and venereal diseases increased apace among the well-fed, starvation merged into cannibalism and

inanition produced the impotence predictable in Claude Bernard's theorem that generation and sex are consequent upon nutrition.

Ashburn finds that the New World was regarded as a Paradise by the old travellers for the reason that the diseases, vices, warfare, and oppression subsequently imported were non-existent in the earlier period of exploration, while most of the diseases which impeded the settlement and development of the continent were brought in by the settlers themselves. Malarial fever, endemic in Spain, was brought into Mexico, Peru and the Antilles by the Spaniards and subsequently by the slave-trade. Smallpox, yellow fever, leprosy, hookworm and other parasitic infections, and probably trachoma, were also brought in by the African negro, who was immune to malarial and yellow fevers. Cerebrospinal meningitis (*modorra*), rampant on the coast of the Bay of Biscay as early as 1409 (Sticker), was probably brought in by the Spaniards. Syphilis, in the findings of Sudhoff, was existent in Europe long before the discovery of America and acquired a superadded virulence when introduced among the Indians and Aztecs. The fact that prehistoric trephining was often repeated, as also the clean healing of wounds in pioneer surgery (McDowell's ovariotomies), suggest that even the pathogens of wound-infection were imported. The diminution or disappearance of the Indian before the advancing white was due in the first instance to imported diseases and later to the warfare made upon him by the settlers. In this extermination, famine, scurvy and starvation also played a part. The Indian, invested with an ideal halo by Rousseau, Pope, Chateaubriand and other sentimental theorists of the *Aufklärung*, was hated at close range, as the native is always hated by the immigrant. The delectable Edens of the earlier travellers became hotbeds of malaria, as Ramon y Cajal found to his disillusionment while on military duty in Cuba. Guayaquil, described by Monardes as a health-resort in 16th Century Peru, became a pest-port later and is now again safe and sanitary. Ashburn's findings illustrate the various factors and coefficients entering into the convection and mobilization of communicable diseases and how their ultimate extermination in a given area is a function of the geomedical status of that area.

Geomedicine, vaguely adumbrated by Finke in the 18th Century, was first clearly outlined as to scope and aims by Philipp Ludwig Wittwer in his *Archiv für Geschichte der Arzneykunde* (1790), the first periodical devoted exclusively to the history of medicine. In the prospectus of his new journal, Wittwer specifies among the material requested by him for publication, reports of travellers upon the status of medicine among primitive peoples and data upon the effect of climate, mode of government, religion, immigration, wars and conquests, degree and extent of culture upon the status of medicine in all times and places. Here, for the first time, the historic phase of geomedicine is

broadly and clearly defined without realizing it and it is plain that the data for the non-existent science must be assembled from the reports of travellers or itinerant physicians. To the old travellers we therefore turn, to find the beginnings of geomedicine in the narrative of Hippocrates' contemporary, Herodotus. Formerly ridiculed as a credulous romancer of "travellers' tales," Herodotus gives us the veritable status of Egyptian, Assyro-Babylonian and Persian medicine in the 5th Century B.C. and his findings have been borne out by the subsequent researches of archæologists, philologists and medical historians. It is an aeroplane view, intercepted (mark this) within a definite time-interval.

The extreme specialization which Herodotus found in the Egyptian medicine of his time (a doctor for every disease or class of diseases) points to the same decadence which we find in the Egyptian art of the New Kingdom. We reason backwards to the Smith Papyrus (Old Kingdom) as we do to the great period of Egyptian sculpture. The surgery of the Smith Papyrus is not so good as that of 4th Century India, inferentially of 5th Century Greece, but is scientific in method and better than that of the Ebers Papyrus. The medicine Herodotus outlines is not even that of the Ebers Papyrus, but of a more decadent period. The communal medicine of Babylon, as Herodotus found it (the whole people as physician), seems decadent, in the light of Virchow's dictum that when medicine becomes absorbed into the general fund of common knowledge, it ceases to be medicine. But doctor and pharmacist are still to be found practising on the street in Persia, North Africa and other Mohammedan areas, where, at the same time, the indoor patient is besieged by swarms of importunate visitors, suggesting lines of treatment. The exposure of the patient to voluntary suggestions of visitors or passers-by, would seem to be some remote phase of Oriental custom. Persian medicine, as Herodotus found and described it, was apparently in a phase of emergent evolution. In the 5th Century B.C., the practices of an essentially nomadic people were merging into those of the agricultural or stationary stage of civilization, when the folk-superstitions codified in the Zendavesta—the sanctity of earth, fire, water, dog and hedgehog, the ritual purification by sprinkling with cattle urine at a respectful distance from fire, water and fertile earth, the exposure of corpses to be devoured by vultures on Towers of Silence—were about to be discarded for something more rational. In Herodotus, we find that the corpse could be buried after only slight laceration by dogs or vultures and that Cyrus had water boiled in brass kettles on the march, for drinking purposes. In other words, earth and water were no longer to be regarded as pure and sacrosanct. With the Arabic conquest, the Persians adopted the religious cult and medical practices of Islam. Adherents of the ancient

faith (Parsees) were confined to the oasis of Yezd or flocked in force to their present stronghold in Bombay, and Persian medicine remained as Herodotus found it, in the gerundive state of being about to be.

It is a commonplace of observation that medicine and medical men are seldom, if ever, mentioned by secular historians, although the impact of disease has not seldom been the determining factor in the success of military enterprises up to the World War and has sometimes had more to do with the decay of empires and the fall of statesmen than the casual dropping of a handkerchief, or "some frail beauty's smile." Livy is explicit as to the demoralizing effect of communicable disease upon troops and of the presence of wounded on the battlefield upon the issue of a battle. Froude, at the beginning of his History of England, ascribes the almost stationary condition of the population of GreatBritain for many centuries to the effects of "Devouring Famine, Plague and War." Wells mentions only Avicenna. When we consider the meagre amount of information about medicine and doctors to be gleaned from the secular historians and writers of memoirs, the wealth of material on geomedicine in the writings of old travellers, from Herodotus down, seems truly remarkable. In the large collection of old travels purchased by Dr. Welch for his Institute, there is hardly a volume which does not contain some effective sidelights or valuable information on the status of medicine in the various countries concerned.

As an example, let us take Hans Staden's account of his captivity among certain cannibal Indians of Brazil in 1547.

These cannibals were about to eat him, when a howling was set up in the huts and he subsequently learned that many of his captors had fallen ill. Believing that Hans Staden's God was angry with them, they implored him to intercede with this God that they might be restored to health. Playing upon this primitive view of disease as a punishment inflicted by a vengeful deity, Hans Staden replied that his God was indeed angry with them for threatening to eat him and, having obtained the king's promise that if he recovered his health, he would not permit his captive to be eaten, he was able, through this superior magic, to temporize and eventually effect his escape. Hans Staden gives other details about the medicine of the Tupi Indians, but we need no further information than the above to estimate

its status in the year 1547, nor is it likely that it ever emerged from this lower level.

In his account of the Barbary States (1738), Thomas Shaw devotes a special chapter to the kind of Moslem medicine practised by the Berbers at the time of his visit (1727).

Decoctions of native herbs or minerals, on the old theory that bane and antidote, disease and remedy flourish side by side in nature; the inevitable charms and spells; routine use of the *hammam* or warm bath; ignipuncture with the red-hot iron in pleurisy and rheumatism; the use of butter, kermes mineral in honey, alcohol or powdered lead to prevent pitting in smallpox; pouring boiling water into open wounds; the use of hot, roasted prickly pear leaves as a dressing for wounds, bruises, boils, abscesses and the sores of bubonic plague; cataplasms of moistened henna powder for slight wounds; and the application of the hot roasted root of the Thapsia plant in sciatica, were among the staple remedies employed. Clysters were virtually unknown; indeed Shaw records that a Turkish gentleman afflicted with violent headache was moved to reject intestinal irrigation at the hands of an English physician on the ground that "so noble a part of the body as the head could not be influenced or corrected by applications made at so distant and ignoble a region as the tail." The Oriental trait of "buying the smallpox," i.e., of rubbing a small incision in the hand with scabs from mild cases, purchased in the open market, was the usual mode of preventive inoculation; but in view of such grave accidental sequelæ as losing the eyes, the practice came to be regarded as tempting Providence and to risk an actual attack of the disease was preferred by most.

Here we have a fairly complete picture of the status of Moslem medical practice in the first half of the 18th Century, with therapeutic features far from contemptible. These phases of half-primitive or semi-civilized medicine may be contrasted with Hilton-Simpson's findings in Algeria in 1912. In this interval of two centuries, Mohammedan practice of medicine and surgery over the same area had improved not a little, largely due to the use of mediæval Arabic text-books of medicine and ophthalmology still printed in Cairo, and better than nothing, albeit, as with all aspects of Moslem medicine in modern life, a distinct phase of marking time in the past.

In like manner, the accounts of the diseases and medicine of the Aztecs, as conveyed in the various histories of the conquest of Mexico by Cortez, deserve study, in connection with the Maya codices, as data of the comparatively un-

explored field of Maya and Aztec medicine. The songs of the medicine man, printed by the civilized North American Indian, John Tanner, in his account of his captivity (1830), including songs for the seeking, finding and administration of vegetable and mineral remedies, summarize everything essential in Indian therapy or other phases of "making medicine." But on the whole, the best formal scientific accounts of the primitive medicine of strange regions and outlandish peoples are to be found in the journals devoted to anthropology and ethnology. Of these, the reports of the Roman Catholic missionary priests in the journal *Anthropos* (Salzburg, 1906-32), are most highly esteemed, as being based upon intimate knowledge of native traits and modes of thought, lengthy experience, careful observation and patient assemblage of facts, sufficient, at least, to set off the difficulties everywhere encountered by the civilized mind in attempting to visualize and interpret the workings of the savage mind. The facts, in any case, speak for themselves, whatever interpretation may be read into them, and under the newer dispensation of anthropology, the findings of folk-medicine are found to converge to a certain lowest common denominator, namely, disease as an effect of supernatural agencies, with charms and spells, plant-lore and psychotherapy as remedial devices. To the savage, and even to the semi-civilized, the natural is the supernatural, or as Sir William Gull put it: "Savages explain; science investigates."

Perhaps the most accomplished and best equipped of professional travellers and explorers was Sir Richard Burton, whose writings abound with valuable data on geomedicine. At Oxford, Burton lived in the house of the celebrated medical scholar, William Alexander Greenhill, who started him on the study of Arabic. As a young officer in the Bombay native infantry, Burton incurred ridicule and obloquy among his brother officers by his propensity for learning all he could about the native dialects, religious beliefs and customs of the Indian peninsula. Later on, as Kipling observed, knowledge of the vernacular became

essential in the military service and the examinations for admission to the Indian Civil Service imply such profound and extensive knowledge of native languages, laws, literature, religious and ethnic traits that no human being could pass more than a fraction of the questions asked. In his translation of the Arabian Nights, his Pilgrimage to Mecca and Medina, his many volumes of African, Asiatic and South American travels, Burton did not consciously follow up medicine as a theme for investigation, nor do we find any special notation of his innumerable observations on primitive medicine in the indexes to his books. Even the invaluable data on Moslem medicine in the footnotes to his Arabian Nights have to be dug out of these volumes, bit by bit, but these data are the findings of one of the keenest, most wide-awake observers who ever lived and one can conceive of no more rewarding line of investigation for a student of geomedicine than to assemble them from the vast *corpus* of his literary output. So too, a study of the medical data in the volumes of travel assembled by Dr. Welch would be in the nature of prolegomena toward a topography of the present condition of medicine, surgery and sanitation all over the habitable globe. Here, the elder travellers were only precursors, it is true, but, even so, the medical historian has more to learn from them than from any of the secular historians.

As an experiment in the possibility of assembling geomedical data from remote or unconsidered areas in the actual world we are living in today, one or two fishing lines of inquiry have elicited astonishingly prompt and sympathetic responses. Dr. Matas, with the genial kindness which has made him so much beloved in our profession, has indicated most effective ways and means of triangulating the present status of medicine in Latin America. Dr. Cyril Elgood, late physician to the British Legation at Teheran, has forwarded a very understandable survey of the present conditions in Persia, where the mediæval medicine of Islam and modern European medicine compete side by side. Dr. James H. Sequeira, President of the

Kenya Branch of the British Medical Association in 1930, sends the following notes on medical conditions in his colony which are of particular interest, in that here primitive African medicine coexists with the kind of medical practice which is going on in prosperous English towns, such as Leeds or Manchester or Birmingham:

The Kenya Colony and Protectorate comprises about twice the area of Great Britain and Ireland, covering 224,960 square miles. It has every variety of climate, from the steamy, sticky heat of the tropical coast and lakeside regions to the cold of 7000-8000 feet above sea-level. The English population live mainly on a high table-land, with a climate as bracing as that of Britain and are thus in position to duplicate home conditions without difficulty. The African population, about 40 different tribes, numbers 2¾ millions, mainly Bantus, Jalua and the virile, warlike Masia (40 millions). The Asiatics, mainly Indians, number about 37,000 and the Europeans 15,000, of whom 5000 reside in Nairobi and 1000 in Mombasa. The population of the Coast and of Mombasa Island is mainly Suahili, a mixture of Arab and Bantu. There are 2280 European and 3365 native officials. As at army posts, free medical attendance is afforded to officials and their families by government doctors, but private practitioners may be consulted on occasion at personal expense. For non-official Europeans there are, in Nairobi, ten general practitioners, a medical and a surgical consultant, an alienist, an ophthalmologist, several European dentists and X-ray operators; and Dr. Sequeira himself carries on in Nairobi his brilliant London Hospital record in dermatology. In the country districts of sufficient European population, there are general practitioners, who, Sequeira says, "act exactly as general practitioners in England and send their difficult cases into Nairobi for general treatment." Nairobi has two excellent nursing homes, where European women are usually attended in pregnancy and confinement; two or three townships have their own hospitals, supported by local rate-paying or private contributions; and there are also extensive hospitals for the African population at Nairobi. Mombasa and Kisumu, in which Asiatics may also be treated in special wards, when not financially able to consult the Indian, Goan and European practitioners. There is also a hospital for insane natives. All the hospitals are staffed by government physicians, European trained nurses, native orderlies, and female assistants. Out-patient departments are provided by government and there are ante-natal clinics, infant welfare units and venereal dispensaries at Nairobi, Mombasa and other centers. School inspection in the towns is forwarded by volunteer government doctors. But all these measures meet the needs of only a small fraction of the native population, distributed over the Native Reserves and on European farms. The European farmer is required by law to house, feed, find and furnish medical attention to his laborers and their families, and often renders first-aid and routine treatment himself. Serious cases are motored to the nearest hospital, at which

the employer pays a subsistence charge to government. Employers of labor on a large scale have their own hospital and dispensary arrangements, supervised by a local practitioner or by a government official with native dressers. In the Native Reserves, there are hospitals with two medical officers, one of whom is usually on tour, visiting regularly the dispensaries. These are constructed by the Native Councils at 20 miles radius from the hospital and manned by native dressers, educated at the Mission schools and trained in the government hospitals. As the European doctors command only the Ki-Suahili dialect, these native dressers are of great use as interpreters of the many local tongues and are often trained microscopists. On *safari*, Dr. Sequeira found them demonstrating the ova of the hookworm or bilharzia, stained specimens of the tubercle bacilli and the trypanosomes from a lymphatic gland in a case of sleeping sickness. Others he found to be expert in the intramuscular injection of bismuth, under strictly aseptic conditions, in the yaws areas, where routine treatment is as extensive and systematic as at Paranaque and other yaws centers in the Philippines. The incidence of syphilis is very variable in the different tribes, and there is a kind of group immunity, "not absolute but relative," in the yaws areas and in tribes in which malarial infection is well-nigh universal. Venereal infection has increased apace with native migration to the towns. Infant mortality, due largely to maternal ignorance and improper feeding, is enormously high, as much as 400 per 1000 births in some areas. There is very little evidence of congenital syphilis as a factor, but here again, nearly every infant in certain areas is afflicted with yaws or malarial fever. Impetigo and intestinal worms are common. Native midwives are pitifully incompetent and the scar tissue from female circumcision (clitoridectomy) is often a serious obstruction to normal labor, with *exitus lethalis* from the bungling episiotomies of sable Sairey Gamps. Dr. Sequeira found a native woman who had been in labor for a week and many moribund cases are motored into hospital. Much good pioneer work is done by the medical missions and mission doctors and the work of the Public Health Department of Kenya is along very advanced lines, covering education of the natives in personal and public hygiene by the printed and spoken word, mass meetings to demonstrate the dangers of parasitic infection, hookworm and sleeping sickness campaigns, moving pictures and district exhibits of hospital cleanliness, use of pit latrines, model houses, etc. In one hookworm area, 50,000 native patients were treated and 7000 pit latrines were dug. At the public health shows, the native dressers, many of them born actors, are eminently successful in interesting the people, so much so in fact, that the headmen of villages have been found to be provided with mosquito netting, gauze-screening against flies and crude rat-proofing. In extent and variety of accomplishment, the Medical Research Laboratory at Nairobi will compare favorably with the Wellcome Laboratories at Khartoum, and is designed to be the centric unit of a hospital system for Europeans, Asiatics and Africans. The range of its accomplishment extends from routine blood examinations for parasites up to regional studies

of mosquitoes and research into the cyto-architecture of the African frontal cortex. The main difficulties encountered in the advancement of medicine in Kenya have been the opposition of the witch-doctors and native firebrands in certain tribes, which has made the work of the government medical official risky and dangerous at times; the effect of tropical rains and deluges on even the best roads and bridges and the general difficulties of transportation. "In some areas," says Sequeira, "we still have the doctor's *safari*, consisting of a lengthy train of boys carrying their impedimenta on their heads." The *Kenya Medical Journal*, red-covered, slender, but substantial in content, is creditable to the enterprise of the infant colony.

Here, then, in the very heart of Africa, we have one of the most successful of British experiments in colonial administration, in which a handful of English physicians have been able to develop English medicine according to English ideas, and, at the same time, indulge the Anglo-Saxon's known propensity for bettering his neighbor. The success of the experiment is probably bound up with the shrewd observation of Froude that the negro is perhaps the only *primitif* who is capable of adapting himself to the ways of the white, or more accurately perhaps, to the ideas and sentiments of the Anglo-Saxon, as a survival-value. Ordinary experience, as the French anthropologist observed, is just the other way around, viz., the immigrant or invader adopts the current ideas and superficial traits, but never the sentiments of the native-born population. Contrast Kenya medicine, for instance, with that of India, in which the Unani and Ayurvedic systems flourish alongside of English medicine; or with that of the Philippines, in which American, Spanish, Chinese and primitive Malay medicine coexist; or with the following, from an esteemed correspondent in Peiping, China:

Modern medicine in Peiping is a distinctly exotic thing, centering around the wonderful organization of the Peiping Union Medical College, built and sustained by Mr. Rockefeller. There are also four or five other medical schools of lower standard, which turn out useful men for general practice, but general medical practice in China is largely in the hands of old style practitioners, who have set up in practice after the most rudimentary training of the old apprentice type. There has never been such a thing as a national medical school or college of Chinese medicine, but training, from time immemorial, has been acquired from medical guilds, like those of ancient Greece. These are very strong and sustained by popular sentiment, which is violently opposed to autopsies, toxicology and laboratory procedure.

Chinese internal medicine, midwifery and sanitation are consequently semi-primitive in character, as in the Dark Ages of Europe. When President Sun Yat Sen lay dying in a hospital from cancer of the liver, he was taken away by native practitioners, who gave him the old potions for quieting the "fire" in the liver and strengthening the *pneuma*. In 1929, Mr. Tan Yen-Kai, the head of the government, sustained an attack of apoplexy, but even the opinion of the Minister of Health was overruled in favor of the worthless remedies of the old school practitioners. The Board of Health, established in the Nanking Government by the Young China Party (1928), has now been demoted to the status of a subsidiary bureau in the Board of the Interior. The 600-700 Chinese physicians who form the National Medical Association, were nearly all of them trained in England or America and flourish in the Treaty Ports. In the interior, modern medical practice is carried on, usually by American physicians, with the utmost precaution and *savoir faire*. There is also the Japanese group, several thousand in number, trained in Japan from German text-books, who care for the Army, Navy and political posts. The International Health Board cooperates with the Board of Health in attempting to float a program for improving sanitation and obstetrics in Peiping, Nanking, Shanghai and Canton. The Manchurian Plague Service, the China Medical Missionary Society and the *China Medical Journal* have all of them, a record of good work and the future outlook is not bad, since the old Chinese practitioners have little organization and build no schools.

These few examples may serve to adumbrate the future importance of geomedicine, in connection with modern facilities for transportation by air and communication by radio. Apart from the dry statistical data available in Blue Books, how many sanitarians, for instance, could visualize offhand the real inwardness of present-day medicine and hygiene in Afghanistan, Bolivia, Borneo, Celebes, North Australia, Siberia, Sierra Leone or Bulawayo in Mashonaland? The first after Wittwer to sense the importance of the subject and to call attention to it was Professor Heinz Zeiss,[3] of the Institute of History of Medi-

[3]See H. Zeiss: *München med. Wochenschr.*, 1931, LXXVII, 198-201; and *Ztschr. f. Geopolitik*, Berlin, 1932, IX, 474-484. Zeiss defines medical geography as that branch of geography which treats of the effect of environment upon the people, animals and plants within a given area; geomedicine as that branch of medicine which investigates medical conditions by the geographic or cartographic method. This provisional definition is obviously dictated by the immense scope of geomedicine. Zeiss's studies center mainly on the medical topography of the Soviet dominion and border-line conditions on the Polish Corridor.

cine in Berlin, whose long residence in Russia under the Soviet régime no doubt impressed him with the necessity of triangulation, similar to Daniel Drake's survey of the Mississippi Valley, if the vast Asiatic plain controlled by the Soviet government is to be made habitable for civilized man. It is even possible that the outstanding achievement of the Soviet organization will be the civilizing of the semi-barbarous peoples of this great plain, where even a moderate increase in creature comforts implies a definite upward trend, contrasting sharply with the somewhat amateurish efforts made to render the populations of Moscow and Leningrad comfortable. Evidence to this effect is already available in such records as Jan Welzl's "Thirty Years in the Golden North" (New York, 1932), the terminal chapter of which describes the crude medicine and surgery which has to be improvised to meet the emergencies of this arctic immensity of desolation. Certainly geomedicine, albeit of Germanic origin, is one of the best things which has come out of the Five Year Plan and the Asiatic dominions of the Soviet would seem to be the most promising field for its immediate practical application.

Geomedicine, or the triangulation of medicine in space, holds out many promising possibilities for future investigation. One of these was thrown into relief at the International Congress of Tropical Medicine at Singapore in 1923. The sense of this Congress was to the effect that each tropical area of consequence has its own peculiar climate, flora, fauna, insects and diseases, whence the medicine or sanitation applicable to each area is *sui generis*. The medical geography, and consequently the geomedicine of Northern Australia, India, the Latin American States, the Philippines, Malaysia, Melanesia and Polynesia are by no means reducible to the pattern implicit in text-books on tropical medicine. Each of these areas has, in fact, its own peculiar type of tropical medicine[4]. Again, enlarging

[4]This phase of geomedicine has even wider implications and applications. Allbutt found that the elegant therapeutic prescriptions introduced by Trousseau at the Hôtel Dieu had no particular effect upon his sturdy

upon Hirsch's original concept of geographical pathology as the effect of climate and environment upon the physiological and pathological status of man, Askenazy has organized an International Society of Geographical Pathology (1928), which aims to coordinate the comparative aspects of disease in different countries, regions and peoples all over the globe. Another promising field is suggested by the immense interest attaching to family-trees and the records of families in present day Germany, where societies for *Familienforschung* are springing up everywhere. The scope of this important line of inquiry is immense, ranging from data in Burke's Peerage, the Almanach de Gotha or Galton's album of talented families to the records of the Jukes, Nams and Kalikaks. Closely related to this important line of inquiry is the distribution of the protean semeiology of a major disease in space, in other words, among the members and collateral sibs of a given family. Apart from the devastating effects of plague, cholera, yellow fever, cancer, and pneumonia as killers, or of syphilis, tuberculosis and malarial fever as poisoners of the human stock, the manifestations of such diseases as gout, rheumatism, neurosyphilis or influenza are polymorphic, of lateral, as well as linear and lineal distribution, so that a complete picture of the disease might be assembled as a summation of its fragmentary manifestations in the members of a given family. The best work in this field to date was done by Sir Clifford Allbutt, who, during his twenty-eight years of medical practice in Leeds, became the county consultant or family doctor of all Yorkshire. He got to know the medical histories of the different county families so well that few Yorkshiremen of consequence failed to con-

Yorkshire patients at Leeds. Stroganoff, applying his expectant treatment of eclampsia to Bumm's obstetric wards in Berlin, could not get the dazzling percentage of success afforded by his Slavic patients. Zeiss notes that the English sweating sickness of 1506-51 did not penetrate the Latin countries or the Slavic north, and notes that the metabolism and disease-reactions of East Prussians are different from those of the Rhineland and the Ruhr, that climatic and meteorologic conditions have remarkable effects upon respiratory diseases and surgical operations in the tropics and the far North, and so on.

sult him during a grave or terminal illness. Twenty years before Charcot, Allbutt saw the protean manifestations of the gouty, rheumatic and neuro-syphilitic diatheses as distributed laterally (in space) as well as lineally (in time), usually pivoting around such cutaneous manifestations as erythema and purpura. Here, an independent disease in an individual may be correlated in space as a mere symptom of a diathesis of wide familial distribution.

Thus, in Allbutt's gouty series, dyspepsia, the arthritides, phlebitis, nephritis, arteritis, angina pectoris, migraine, hypochondria, insanity, neuritis, glycosuria, bronchitis, hæmorrhoids, hæmophilia, and eczema may be distributed among the ascendants, descendants and collateral sibs of a familial stock. In his neurotic series, insanity, chorea, hysteria, migraine, angina pectoris, gastralgia, asthma and catarrh may pivot in the same way around eczema and pruritus.

Allbutt's studies, continued by Osler, Libman and others, tend to confirm the subsequent observation of Charcot that the gouty-rheumatic and neuro-syphilitic diatheses are like two trees, the roots of which are so inextricably interwined that above ground they seem to be one tree. How else explain the successful treatment of arthritis deformans by operative resection of ganglia in the sympathetic chain? Today, when the doctor's practice is mainly transient office and hospital practice, there are no such opportunities for the study of disease in space as existed by Yorkshire bedsides or among the immense clientèle of the Salpêtrière. Retrospective studies of the familial distribution of disease in space from existing records would be a way out, incidentally one of the most fascinating prospects held out by the future science of geographical or global medicine. Very important too, are the studies, actual and prospective, of Professor Sigerist upon the relations of civilization and disease, which connote a certain philosophic parallelism with the larger problem of the effects of civilization upon the status of medicine in space and of medicine upon the spread and advancement of civilization in space. Another important line for future cooperative investigation is the closer study of the impact of disease upon particular ethnic stocks or the reactions of race to disease, with special re-

gard to the effects of mongrelization and change of environment. Yet another is the relative importance of character and mentality in the general run of the medical profession, in other words, the remarkable development of crime and of criminaloid traits of character even among physicians since the World War. On this head, the novelists are profuse and voluble, the English and American being more dramatic and sensational in their approach, the German more scientific. Some of the German medical periodicals, in fact, have deliberately posted current instances of crimes perpetrated by medical men. Of old, the doctor was ridiculed everywhere as an actual or potential killer at the bedside and there were mediæval physicians who kept patients on their books by keeping them sick or making them sicker during convalescence. Never make your doctor an inheritor was an old Latin proverb. Today, ways and means of "getting away with murder" are manifold and the detective or mystery stories often put scientific weapons into the heads or hands of the criminal-minded. The *crux* lies in the definite break between the tendency of the past to protect society by punishing the guilty, to the extent of sometimes executing the innocent, and the present aim to protect the innocent to the extent of releasing many of the guilty upon legal technicalities. The criminal exploitation of medical science and of the professional status by adventurers, *intrigants* and thugs is an unwritten chapter in the annals of medicine. Finally, there is the aspiration of the League of Nations toward global sanitation and world-control of disease. This is probably the only line of endeavor in which its efforts will be finally fruitful; since to wish or decide that wars may not exist in future is velleity but not volition. The new science of geopolitics, from which geomedicine confessedly derives, does indeed plan to triangulate the political and social status of all nations and peoples; and such knowledge might eventually be utilized in aid of forestalling the possibility of future wars and rumors of war. But these sciences are as yet gerundive or inchoate and their practical application to the world's business seems milennial. The great

difficulty with pacifism is, in fact, that it postulates a purely imaginary or ideal world, realizable perhaps hundreds of years hence, but populated exclusively by plaster saints and stage angels, who, as Emerson put it, are fain to "hang on to the huckleberry bushes to keep from being translated to the skies." It is the eternal opposition between the schizophrenic idealist of Don Quixote type, tilting vainly for the forlorn hopes of the *mens sibi conscia recti,* and the pycnic materialist of Sancho Panza type, adapted physiologically to the ways of the world, which idealist and fanatic will never quite succeed in unmaking. But, as pycnics, like attempts at government, are manic-depressive, there is always some faint possibility of the awakening implicit in the line of Baudelaire—

"Eh bien, mon cœur, dors ton sommeil de brute,"

which Matthew Arnold rendered so neatly, without intention—

"Live we like brutes our lives without a plan,"

and successful planning for the future of humanity will imply, if nothing else reasonable insight into the probable needs of whatever people may constitute the world of the future. In the world, as at present constituted, the idealists seem, in Carlyle's expression, "more winged than solidly ambulatory," the *erdgebunden* display the indifference of all natural shock-absorbers to untried paths, and we see as in a glass, darkly, with reference to the Soviet, the first great outdoor experiment of altruism along purely materialistic and mechanistic lines.

The decisive lessons of geomedicine were learned on the battle-fronts of the World War, from which its origins may be said to date. The mobilization of gigantic bodies of troops on the Eastern, Western and Italian fronts, exposed to the impact of strange diseases as never before, proved to be an unique *plein air* experiment in the possibilities of mass-sanitation and salvage of the sick and wounded. So effective were the means available for coping with communicable diseases that, apart from the experi-

ence of the German Army in the Franco-Prussian War. the mortality from battle wounds exceeded that from disease for the first time in history. At the end of the war came the epidemic of Spanish influenza, which, by reason of the unsuspected hæmolyticus element, baffled the medical profession to the extent that its destructive power approached that of the great mediæval epidemic of plague or the Asiatic cholera of the post-Napoleonic period. Even among soldiers, the mortality from Spanish influenza was greater than that resulting from the battle-wounds and trench diseases of the World War. It is from such terrible lessons as these that the future science of geomedicine derives its objectives, if not its inspiration. To geomedicine, the medical historian of the future must look for his data through successive periods, for he will be concerned, not only with the achievement of a few advanced civilizations, but with the medicine and sanitation of the whole world (*la médecine globale*).

The physician or sanitarian who writes the first going treatise on geomedicine will make an enviable record for himself in the annals of our profession. Such a task will never be compassed by shallow, superficial reasoning from hastily assembled, hence insignificant data. It will require "courage stout," years of travel, years of patient labor, rich funds of humor and saving common sense, a literary feeling for what is luminous rather than voluminous, and above all an appreciation of the altruistic sentiment underlying the thought of Descartes, that medicine may be the great civilizing agent of the future. *Les grandes pensées viennent du cœur.*

F. H. GARRISON

REPORT OF STUDY OF ADMINISTRATION OF CONVALESCENT SERUM IN THE TREATMENT OF POLIOMYELITIS

Since Professor Netter of Paris first introduced the therapeutic use of convalescent human poliomyelitis serum in 1911, the therapeutic employment of the serum has gradually extended until it has become widely resorted to wherever convalescent serum can be obtained. In the early years there was little discrimination in its use, paralytic and preparalytic cases being treated indifferently. During the latter period, the tendency has been more and more to restrict the serum to early, preferably preparalytic, cases of the disease. The consensus of opinion has been that the convalescent serum is therapeutically valuable. It has, however, been recognized that epidemic poliomyelitis is clinically a highly variable disease. The manifestations are protean in their variety and degree of severity. As the diagnosis has been increasingly perfected, larger and larger numbers of cases of mild illness have been included in the classification of the malady.

At the time this study was begun no considerable outbreak of poliomyelitis had occurred in New York City since the overwhelming epidemic of 1916. However, indications were not wanting in other parts of the United States, as well as in Europe, that the epidemic disease was again becoming active. In 1926, Dr. George Draper stated that the only hopeful method of treatment of poliomyelitis was by use of convalescent human serum administered in the preparalytic stage of the disease, and he suggested that the Academy of Medicine keep a supply of the serum on hand.

Impressed with the growing severity of outbreaks of poliomyelitis in the United States, Dr. Simon Flexner made a similar suggestion to the Academy, which suggestion was referred to the Public Health Relations Committee in 1928. Before the matter was discussed with the Public Health Relations Committee, the Director conferred

with Dr. Louis I. Harris, then Commissioner of Health, who stated that he had no faciluties for collecting the serum. He approved the proposal that the Academy undertake to collect serum and to distribute it under conditions of control (having in mind a critical study of the therapeutic results obtained).

The Public Health Relations Committee also approved of the project and appointed a special committee consisting of the following:

Dr. Harold L. Amoss	Dr. George Draper	Dr. Josephine B. Neal
Dr. W. Lloyd Aycock	Dr. Simon Flexner	Dr. William H. Park
Dr. E. H. L. Corwin	Dr. Royal S. Haynes	Dr. Philip Van Ingen

Dr. Linsly R. Williams, Chairman

Dr. Philip Van Ingen was appointed Chairman, but was succeeded in the summer of 1928 by Dr. Linsly R. Williams. Miss Gladys Adams served as Secretary during the summer of 1928.

During the earlier meetings of the Committee in the spring of 1928 the following points were considered:

1. The value of convalescent serum and its method of administration
2. The collection of serum
3. Preparation of the serum
4. The administration of the serum and the compilation of records
5. Announcements to the medical profession

Dr. Alfred E. Fischer, a practicing physician in this city, and Dr. Herbert Scheffer, on the staff of Dr. William H. Park at the Health Department Laboratories, cooperated in securing blood from convalescent patients during the first six months. A considerable amount of blood was obtained from the following hospitals: Ruptured and Crippled, New York Orthopedic, Hebrew Home for Crippled Children and the New York State Hospital for Crippled Children. The Committee is very appreciative of the cooperation of the staff of these hospitals.

The amount of blood obtained from these sources was not constant and advertisements were inserted in the papers, asking convalescent patients to appear at a certain time so that blood might be taken from them, and with the cooperation of the Cornell Clinic, patients were seen there

on Saturday afternoons. A considerable amount of blood was obtained in this manner. The blood was taken to the laboratory of the City Department of Health, where the serum was prepared and several doses were distributed to the cooperating physicians. (For method of preparation see Appendix A.) This procedure was carried out in the summers of 1928, 1929, 1930 and 1931. During the first three summers a sufficient amount of serum was available as a very limited number of cases occurred in the city. In the summer of 1931, with a far larger number of cases, it was impossible to secure a sufficient amount of convalescent blood serum.

No definite rate of payment was determined upon to convalescent blood donors. A number of individuals who were well to do offered their blood gratuitously but in general most of the donors were paid from $5 to $10 and in many instances carfare or taxi fare was paid.

Administration of Serum

It was clear from the outset that the object of the Committee was to make a clinical study and not to supply every demand. Physicians were appointed by the committee and paid for rendering the following service:

1. Consultation with the family physician
2. Making complete examination and recording it on proper forms
3. Performing a spinal puncture
4. Making a cell count at the bedside
5. Administering the serum intraspinally and intramuscularly or intraspinally and intravenously
6. Making a second visit to administer second dose of serum on second day
7. Making subsequent follow-up visit

The physicians selected were chosen on account of their hospital experience and technical training and the fact that they would be available throughout the summer for work at any time.

After several discussions the Committee approved of a series of regulations which were distributed to the cooperating physicians. (See Appendix B.) It was also agreed by the Committee that a family would be asked to pay $25

for the consultation, examination and administration of the serum to repay in part the cost of the collection and preparation of the serum and for payments to the physicians. It was suggested that in some instances families might be willing to contribute more than that sum, but that no money was to be demanded of families who could not afford to pay. The following physicians acted as cooperating physicians during the summer of 1928, 1929, 1930 and 1931:

1928

H. W. Dargeon
Leonard T. Davidson
Alfred E. Fischer
T. T. Mackie
Carl Smith
Scott Johnson
Herbert Scheffer
Charles Weymuller
Lambert Krahulik
Joseph C. Regan
Samuel Cohen
William Messer
David Greene
Herman Frosch
Harry Mackler
James R. Reuling
Stanley Pettit
E. D. Scala

1929

Alfred E. Fischer
Jacques Lewis
Harry Mackler
William Messer
Joseph C. Regan

1930

Alfred E. Fischer
Jacques Lewis
Harry Mackler
William Messer

1931

Alfred E. Fischer
Jacques Lewis
Sidney Leader
Harry Mackler
Carl Smith
William Messer
Stanley S. Lamm
David Merksamer
K. Kingsley
Milton E. Robbins
Harry S. Lichtman

The Committee also discussed at one of its meetings the possibility that physicians might oppose this type of work and that the family physician might object to having the serum administered by the cooperating physician. It was found in a number of cases that the family physician desired to administer the serum himself, though in most instances he preferred to have the serum administered by one of the cooperating physicians. No difficulties were experienced with physicians in this regard during the first three summers. During the summer of 1931 several complaints were made by physicians. Upon investigation these were found to be unreasonable.

Announcements to Physicians

Experience with earlier epidemics had indicated that there were many physicians who had never seen a case of poliomyelitis in the early stages. It was felt that treatment with convalescent serum was only of value in early

cases in the preparalytic stage. The following procedure was carried out: with the cooperation of the Commissioner of Health of the City, articles were published each year in the Bulletin of the City Department of Health, on the early diagnosis of poliomyelitis. These were prepared by Dr. George Draper. Announcements were also made in the Bulletin giving the names, addresses and telephone numbers of the physicians engaged in the study.

Medical Week, a weekly bulletin of medical announcements and medical news, published by the Medical Society of the County of New York, also rendered cooperation by carrying each year brief statements of the object of the study, the methods to be employed, the charges to be made, and the names, addresses and telephone numbers of the physicians.

Statements or interviews were not issued to the press as it was felt that it would be wiser if patients were referred by their family physicians and did not come directly to the physicians engaged in the study. There were, however, several interviews given to representatives of the press in the spring and summer of 1928, at the time that advertisements were inserted in the press to reach convalescent poliomyelitis cases who would be willing to serve as blood donors, as this was a novel procedure.

Experience of 1928, 1929 *and* 1930

In 1928, 521 cases of poliomyelitis were reported to the Health Department of the City of New York during the five months, June to October inclusive. There were 125 deaths, a case fatality rate of 26%. Sixty-one of these cases were treated with serum, among which there were 18 deaths, a case fatality rate of 29%. Twenty-one of these cases were treated in the preparalytic stage and there were 3 deaths, a case fatality rate of 14%. An effort was made to compare these cases with the number treated in the city hospitals of which there were 767, without any satisfactory conclusion.

During the four summer months of 1929 there were 38 cases of poliomyelitis reported in the city. Serum was

administered to 6 cases, 4 of which were treated in the preparalytic stage, and of these, 3 recovered without paralysis.

In 1930 there were 27 cases reported to the Health Department during the four summer months. Of these 14 were treated, 6 in the preparalytic stage, 5 of which entirely recovered.

Experience of 1931

The number of cases reported to the City Health Department during the year was 4,154, of which 4,058 occurred during the months of June, July, August, September and October. Five hundred and two deaths were reported, a case fatality rate of 12.1%. The Committee's physicians visited approximately 800 cases. During part of this period it was not possible to respond to every call or to administer serum as the amount was at times either limited or not available. Four hundred and seventy-seven cases were treated in the preparalytic stage and among these there were 18 deaths, a case fatality rate of 3.8%. Observations were made of 102 cases in which no serum was administered, and in these cases there were two deaths, a case fatality rate of 2%.

Statistical Study

The completed record cards of 477 cases were submitted to statisticians who compiled tables which show the monthly incidence of cases, the extent of paralysis of the treated and untreated cases at the time of visit and the resulting paralysis of 459 of these cases. The paralyzed cases were classified at the time of discharge and again three months later. The usual tables were also made in regard to sex and age incidence, as well as temperature, onset and cell count. Tables were also compiled indicating the results of treatment by different days from the onset of meningeal symptoms and the result in accordance with the amount of serum administered.

As the serum was administered either intraspinally and intravenously or intraspinally and intramuscularly, these

results were also tabulated. A comparison was also made between the cases selected for treatment with serum and those not treated.

Consideration of the Results of the Poliomyelitis Study

As indicated earlier in this report, it was felt that it would not be possible to state whether the convalescent serum was of real value or not unless a comparison was made between the treated group and the untreated group of patients.

Several considerations immediately arise which color the entire situation:

Among the 4,154 cases reported in the city during the year 1931, the case fatality rate was over 12% and the case fatality rate among the 477 treated cases was 3.6%. This fact, however, does not warrant the conclusion that the treatment produced a far better result in terms of lower mortality. The following questions also suggest themselves: How many unreported mild cases were there in which there were only prodroma or mild meningeal symptoms not developing paralysis? How many other forms of mild cases with slight weakness or temporary paralysis were not reported? Were the cases referred to the physicians cooperating in the study in general of a milder nature than those reported to the Health Department? Did the family physicians who sought the serum treatment for their patients recognize the fact that it was useless to treat bulbar or frankly paralyzed cases? Was this group of physicians better informed on the diagnosis of poliomyelitis and did they seek the serum treatment as soon as they suspected poliomyelitis? Naturally, these questions cannot be answered any more than if one were making a similar study in a similar way of the results of treatment in any other disease.

When one goes farther, as was done during the period in which no serum was available when 102 untreated cases were followed and it was found that in this group the mortality was slightly less than 2%, a similar series of

questions arises. First, were the treated and the untreated group comparable? In an endeavor to ascertain whether or not the untreated group was a milder group than the treated group, each physician was asked to classify his cases as "mild," "fairly ill," "seriously ill," or "extremely ill." Statistical analysis of the data based on this grading of the cases comparing the treated with the untreated group and computing the difference between the two groups with relation to the seriousness of the illness of the individual cases composing them, show that the untreated group was indeed a much milder group than the treated group. There were also differences in age distribution and other factors which may have influenced the end results.

Conclusion

The results of the study are therefore inconclusive. Many of the members of the Committee and the physicians who took part in this study feel that more accurate and more intensive work should be done along these lines.

The Committee expresses its gratitude to the several individuals who contributed funds for the purpose of making this study and also expresses its appreciation of the willingness on the part of many persons previously affected with poliomyelitis, who voluntarily gave of their blood to the Committee. The Committee also expresses its satisfaction with the work performed by the cooperating physicians, who devoted their best efforts under many trying circumstances, not only to help children who were affected with poliomyelitis, but who also kept careful records of the work performed.

LINSLY R. WILLIAMS, *Chairman.*

APPENDIX A

PREPARATION OF POLIOMYELITIS CONVALESCENT SERUM

In selecting convalescent donors for the preparation of serum account is taken of their general physical condition.

age and body weight. The amount of blood taken is determined by these factors. From healthy children 13 to 16, the amount drawn varies between 175 and 250c.c. From adults 500c.c. may be taken if necessary, and in the case of professional donors this amount may be removed once in 3 weeks if their condition allows. It is customary to pay the professional donors $10.00 for 100c.c. drawn. Probably the more recent the attack of poliomyelitis, the more efficient will be the serum, though there is no definite opinion on this. There is evidence of the presence of immune bodies in serum from patients 20 years after the attack.

In drawing the blood, the subject reclines with head slightly elevated. After painting the antecubital region with iodine and washing with alcohol, a tourniquet is applied above the elbow and a large gauge Luer needle is inserted into one of the superficial or deep veins. The needle is connected by sterile rubber tubing to a rubber stoppered sterile 500c.c. wide mouth bottle. The air in the bottle is gently evacuated by means of a small hand suction pump connected by another piece of rubber tubing. The bottle should not be filled over half full of blood so that clotting may take place in a slanting position. After allowing the bottle to stand slantwise, at room temperature for ½ hour it is transferred to a refrigerator and allowed to remain for 24 hours. The more or less clear serum is drawn off in a suitable sterile bottle and the clot is separated from the sides of the bottle with a sterile glass rod, and returned to the refrigerator in an upright position. Within a few hours, additional serum may be poured off. This second lot will contain a great many red cells. Both lots are centrifuged to remove suspended red cells and then pooled. The preservative is then added as follows:

A mixture of tricresol one part, and ether two parts, is freshly prepared and added to the serum in such proportion that the serum will contain 0.3% tricresol. The addition is followed by agitation to thoroughly incorporate

the preservative in the serum. The serum is then passed through a mat of pulped filter paper and then through a Berkefeld Filter, W grade, and put in ampules, 18c.c. to the ampule. One ampule in every five is first rinsed out with about ¼c.c. of serum, the rinsings being inoculated into a tube of deep veal broth. This serves as a sterility test for the serum, ampule and technique.

If it is not possible to obtain a recent Wassermann report on any donors used, a Wassermann test may be performed on the pooled serum from several individuals.

APPENDIX B

Committee on Poliomyelitis

Instructions For Physicians Cooperating With The Poliomyelitis Comm.

1. The Committee on the study of the therapeutic value of convalescent serum for poliomyelitis has a limited sum of money available for trying out the value of the serum.
2. It is known that the cost of obtaining the serum alone will be approximately $40 per treatment.
3. It is hoped that a proportion of this sum will be repaid by those receiving the treatment.
4. A sufficient amount of serum to treat two cases will be sent to each one of the cooperating physicians from the research laboratory of the Department of Health as soon as it is available. These doses will be accompanied by sterile flasks for spinal fluid.
5. The serum must be kept in an icebox until used.
6. Family physicians will usually call upon the cooperating physician from the Borough in which the cooperating physician lives and he will be expected to respond to any call.
7. When a cooperating physician receives a call from a

physician he will explain to him that the family will be expected to pay $25 for the serum, which is less than the cost of obtaining it, and that there will be no charge for its administration.

8. The cooperating physician will also advise the physician to give the patient a dose of magnesium sulphate of such amount as the family physician deems necessary in accordance with the size of the patient.

9. A diagnosis will be difficult unless in the presence of a real epidemic, but if a probable diagnosis is made by making a cell count of the spinal fluid, the remaining spinal fluid withdrawn is to be placed in the sterile flask provided for the purpose and sent by hand to the Department of Health Laboratory, Foot of East 16th Street, in care of Dr. Neal, where further examination will be made.

10. The cooperating physician will then give the serum by one of the following methods, viz:
    a. 20c.c. intraspinally and 50c.c. intravenously or intramuscularly.
    b. 70c.c. intravenously or intramuscularly or both, depending on the condition of the patient.

11. Approximately twenty-four hours thereafter a second dose of 20c.c. will be given intraspinally if the first dose was given in this manner. If the first dose was given intravenously or intramuscularly, the second dose of 20c.c. should be given by the same route as the first dose.

12. Some people object strenuously to the administration of serum. In such cases the explanation should be made that the serum comes from human beings who are normal except that they have had poliomyelitis, and that their blood has been tested to be sure that it is free from any impurities.

13. A supplementary visit by the same cooperating physician will be made from two to three weeks after the

administration of the serum to ascertain the result, unless this can be learned satisfactorily from the family physician.

14. It is believed that the serum is of value in the preparalytic stage of the disease and it should not be given if paralysis has existed for over twelve hours. It must be remembered that the serum is presumably of no value after the paralysis has been recognized and that the amount of serum available for use will be very limited.

15. The report cards will be filled out at the bedside and mailed to the Poliomyelitis Committee, The New York Academy of Medicine, 2 East 103rd Street; a check for $25 should accompany the record. In the case of known indigent families, payment will not be possible and an explanation of this fact should accompany the report.

16 Upon receipt of the report card which indicates that serum has been administered, the Academy will notify the Health Department Laboratory, and see that an additional dose of the serum is mailed to the physician.

17. The cooperating physician will be paid by the Academy committee $10 for the first visit and $5 for the second and third visits, a total of not over $15 per patient treated.

18. It would be well if the cooperating physicians carried a copy of these instructions with them to show to the family physician or the family if necessary.

SEVENTH SERIES

of

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to be held
at 4:30 o'clock

THE NEW YORK ACADEMY OF MEDICINE

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1932-1933

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1932

NOVEMBER 4

The treatment of common injuries.

Wounds, burns, fractures, dislocations, joint trauma comprise the main group. Early definitive treatment the main clue to success. Antiseptics relatively valueless. Early reduction of fractures or dislocations means easy reduction and obviates the necessity for more elaborate operative or non-operative treatment. Automobile accidents almost epidemic.

John J. Moorhead, *Professor of Traumatic Surgery, New York Post-Graduate Medical School.*

NOVEMBER 11

Dietetic treatment of chronic Bright's Disease.

Presentation of the diets suitable for the treatment of chronic Bright's Disease according to clinical and experimental observations of the last decade. There are six factors in Bright's Disease that demand individual consideration: kidney pathology, renal function, blood pressure, edema, anemia, uremia. The optimal dietetic therapy of each of these conditions is discussed and these principles are applied to patients in which the six factors are combined in various ways.

Herman O. Mosenthal, *Professor of Medicine, New York Post-Graduate Medical School.*

NOVEMBER 18

Etiology, diagnosis and treatment of chronic non-tuberculous lung infections.

The subject deals with chronic non-tuberculous pulmonary disease associated most often with infection of the sinuses, and hardly at all with the rarer non-tuberculous diseases such as spirochetosis, aspergillosis, etc.

David Riesman, *Professor of Clinical Medicine, University of Pennsylvania.*

DECEMBER 2

Migraine and its treatment.

The general problem of migraine will be presented with a short description of its historical background, its symptomatology, the various theories which have been advanced for its causation, the metabolic and chemical findings in those who suffer from its effects and the present situation in the therapy of the disorder.

Henry Alsop Riley, *Professor of Neurology, College of Physicians & Surgeons.*

DECEMBER 9

Psychiatric approach of the practitioner to his patient.

Mortimer W. Raynor, *Professor of Clinical Psychiatry, Cornell University Medical College.*

DECEMBER 16

Treating the pneumonia patient.

Alexander Lambert, *Visiting Physician, Bellevue Hospital.*

1933

JANUARY 6

Menopause disorders. (Lantern slides)

A general discussion of menstrual disorders with especial reference to dysfunctional bleeding, its relationship to cancer, and proper evaluation of constitutional nervous symptoms of the natural and artificial menopause.

William P. Graves, *Emeritus Professor of Gynecology, Harvard Medical School.*

JANUARY 13

The x-ray in the diagnosis and study of pulmonary tuberculosis.

Technique. Principles of interpretation. Indications for x-ray examination. Correlation of x-ray and physical signs. Correlation of x-ray findings with pathological lesions. Value in early diagnosis. In differential diagnosis. Importance of serial x-ray studies. Relative responsibilities of the radiologist and internist.

James Alex. Miller, *Professor of Clinical Medicine, College of Physicians & Surgeons.*

JANUARY 20

Indications for conservative treatment of gall-bladder disease.

Most diseases that affect the gall-bladder are not amenable to conservative treatment but are frankly surgical. These refer particularly to calculi, new-growths, and acute and sub-acute inflammatory conditions.

Low grade infections of the gall-bladder and ducts where function, as evidenced by cholecystography, is maintained lend themselves to conservative treatment.

(1) Dieting; (2) drug therapy; (3) biliary drainage; (4) Spa treatment. The use and abuse of any of these mediums will be discussed.

The greatest assistance may be rendered in ascending biliary tract infections where duodenal drainages offer alleviation. A discussion of the hepatitis which is an essential part of the clinical and pathological picture of gall-bladder infection will be undertaken.

Burrill B. Crohn, *Associate Physician, Mount Sinai Hospital.*

JANUARY 27

Gout and the uric acid problem in the practice of medicine.

Gout as a practical problem in medicine today. Painful conditions which might possibly be confused with it. Our laboratory knowledge of the condition will be discussed. An attempt will be made to assay the significance and reliability of the popular blood uric acid determinations in relation to conditions of ill health.

William S. Ladd, *Associate Dean and Assistant Professor of Clinical Medicine, Cornell University Medical College.*

FEBRUARY 3

The neurological examination and interpretation of neurological signs.

Neurological signs, what they mean and how you elicit them. The neurological examination as a procedure for investigating the physiology of the nervous system. Neurological signs show only anatomical localization. When one knows the localization of a lesion one can visualize the pathological anatomy from the history of the case and a knowledge of pathology. When one knows the pathological process one can then figure out the prognosis and treatment.

Louis Casamajor, *Professor of Neurology, College of Physicians & Surgeons.*

FEBRUARY 10

Medical and surgical complications in the diabetic: Their diagnosis and treatment.

Surgical conditions and surgical complications are of necessity encountered in a large proportion of individuals suffering from diabetes. Proper understanding as to the nature of these complications, and adequate procedure in dealing with them, are important. The matter of pre- and post-operative treatment of simple surgical conditions, as well as the management of the even more common infections and vascular lesions occurring in the diabetic, will be discussed. A method for the determination of the degree of vascular involvement and circulatory impairment will be presented with especial reference to the diagnosis and treatment of these lesions.

Albert A. Epstein, *Attending Physician, Beth Israel Hospital.*

FEBRUARY 17

Pyogenic infections of the genito-urinary tract.

Factors entering into the etiology of kidney infections. Bacteria and paths of invasion. Pathology and symptoms of the various types of renal infection— their diagnosis and treatment. Infections of the bladder, prostate and seminal vesicles, and their relation to infections of the upper urinary tract. Lantern slides.

Henry G. Bugbee, *Urologist, St. Luke's Hospital and Woman's Hospital.*

FEBRUARY 24

Thrombosis and embolism.

George David Stewart, *Professor of Surgery, University and Bellevue Hospital Medical College.*

MARCH 3

General infections in children and their treatment.

Royal S. Haynes, *Consulting Physician, Willard Parker Hospital.*

MARCH 10

Recent developments in the study of tuberculosis of interest to physicians.

The nature of the tuberculous process in man and animals. The relation of skin sensitiveness to the disease. (Allergy, immunity, and the tuberculin reaction). The need for a standard tuberculin for epidemiological and diagnostic studies. Improvements in the last five years. The implements used for epidemiological studies. (X-ray and tuberculin). Fallacies in conclusions under present methods. The import of modern studies in chemistry and biology to tuberculosis. The tubercle bacillus and its living chemistry. The monocyte and its life history. The serum and its contents.

Wm. Charles White, *Chairman, Committee on Medical Research of the National Tuberculosis Association.*

MARCH 17

Chronic arthritis.

A presentation of chronic arthritis with special reference to rheumatoid (atrophic; chronic infectious) arthritis and osteo (hypertrophic; degenerative) arthritis. Rheumatoid arthritis; bacteriology; streptococcus agglutination tests; relationship to rheumatic fever; subcutaneous nodules; value of sedimentation rate of erythrocytes; methods of treatment including results with vaccine therapy. Osteoarthritis; regarded simply as an aging of joints; the futility of vaccine therapy in this condition.

Ralph H. Boots, *Assistant Attending Physician, Presbyterian Hospital.*

MARCH 24

The management and treatment of the patient with coronary artery disease.

The importance of detailed instruction as to the mode of life of patients with coronary artery disease. The psychological handling of the patient is even of greater importance than the pharmacological. Factors influencing prognosis. Evaluation of methods of treatment.

Marcus A. Rothschild, *Attending Physician, Beth Israel Hospital.*

MARCH 31

BULKLEY LECTURE: *The care of the cancer patient.*

While some considerations will be given the special treatment of cancer, it is the chief purpose to stress some of the general considerations which always arise in a family, one member of which is afflicted. Problems of general medical care as well as precautionary and preventive measures, general medical care and supporting treatment,

specific medication as well as palliative measures for the more advanced cases will be discussed. Social problems relating to the care of the patient as well as the relationship between the family doctor and special practitioner will be referred to. In other words, an effort will be made to visualize the many problems attendant upon the management of a cancer patient from the viewpoint of the family physician rather than that of the specialist.

DOUGLAS QUICK

APRIL 7

Treatment of malnutrition of acute and chronic origin.
Alfred Stengel, *Professor of Medicine, University of Pennsylvania.*

RECENT ACCESSIONS TO THE LIBRARY

von Bergmann, G. Funktionelle Pathologie.
Berlin, Springer, 1932, 425 p.

Busson, B. Prophylaxe und Therapie der Infektionskrankheiten und Idiosynkrasien.
Wien, Springer, 1932, 237 p.

Castelfranchi, G. Recent advances in atomic physics.
Phil., Blakiston, 1932, 2 v.

Davies, E. C. H. Fundamentals of physical chemistry.
Phil., Blakiston, [1932], 370 p.

Delater, G. Les maladies des veines et leur traitement.
Paris, Masson, 1932, 371 p.

Duvernoy, M. L'inspection médicale des écoles. 2. éd.
Besançon, Chicandre, 1932, 236 p.

Erdmann, J. F. Erdmann's clinics.
Phil., Saunders, 1932, 315 p.

Girardi, P. Malattie dell' apparato digerente ed elementi di dietetica.
Torino, Unione Tipografico-Editrice Torinese, 1932, 626 p.

Kindberg, M. L. & Monod, R. A. J. Les abcès du poumon.
Paris, Masson, 1932, 322 p.

Labbé, E. M. Leçons cliniques sur le diabète.
Paris, Masson, 1932, 333 p.

Lebeuf, F. & Mollard, H. Les sels d'or en dermatologie et en syphiligraphie.
Paris, Masson, 1932, 168 p.

McDowall, R. J. S. The science of signs and symptoms in relation to modern diagnosis and treatment.
N. Y., Appleton, 1932, 440 p.

Monscourt, H. J. P. L'otorrhée gutturale.
Paris, Maloine, 1932, 160 p.

Nisio, G. La diagnosi della tubercolosi renale nell' infanzia e negli adulti.
Bologna, Cappelli, [1932?], 172 p.

Pellegrini, R. Trattato di medicina legale e delle assicurazioni sociali.
Padova, Milani, 1932, 2 vols.

Reding, R. Le terrain cancéreux et cancérisable.
Paris, Masson, 1932, 389 p.

Rehm, O. Atlas der Zerebrospinalflüssigkeit.
Jena, Fischer, 1932, 35 pl.

Sayé, L. Pneumolyse intrapleurale.
Paris, Masson, 1932, 238 p.

Schlecht, H. Blutkrankheiten.
Dresden, Steinkopff, 1932, 197 p.

Schulmann, Ernest. Études cliniques de syphiligraphie.
Paris, Masson, 1932, 290 p.

Segre, R. Le malattie del miocardio.
Bologna, Cappelli, [1932], 482 p.

OBITUARY OF GRAHAM LUSK

The death of Graham Lusk, Associate Fellow of the Academy and one of its most distinguished members, occurred on July 18 of this year. Although he had no medical degree and thus was not directly concerned with Academy affairs, he gave invaluable help in carrying out the Academy ideals for the advancement of scientific medical knowledge.

Dr. Lusk was born at Bridgeport, Connecticut, on February 15, 1866, and at the age of twenty one graduated from the School of Mines of Columbia University. His interest was in Chemistry and following his graduation, he spent three years at the University of Munich, where he received a Ph.D. degree in 1891. During this period he worked in the laboratory of Carl Voit, and his association with that great teacher and scientist started him on his life work along the lines of metabolism and nutrition. On his return to this country he joined the faculty at Yale University and was Professor of Physiology there

from 1895 to 1898. During this time the union of the New York University and the Bellevue Hospital Medical Colleges had been brought about and in the reorganization which followed, Dr. Lusk was made Professor of Physiology. He held this position from 1898 until 1909, when he accepted a corresponding position at the Cornell University Medical College, retaining this until the current year. He made this transfer chiefly because of special facilities for calorimetric work, necessary in his metabolism experiments.

During his Professorship at New York University, Dr. Lusk developed a very marked interest in bringing into closer relationship the fundamental laboratory sciences and clinical medicine. This interest was started by his father, who had himself been a teacher of Physiology and it grew through his association with the two Janeways, especially Theodore, who was beginning his clinical career, and through his friendship with Friedrich v. Muller, who had been a student with him under Voit. With the idea of aiding in the advancement of scientific medicine in New York City, Dr. Lusk conceived and brought into existence the Harvey Society, at first an independent organization but now closely affiliated with the Academy. The purpose of this society was the diffusion of knowledge of the medical sciences through open lectures by research workers who were authorities in their fields. The financial support of the society came from a group of about two hundred associate members, all Fellows of the Academy, and the lectures were announced as being given under the patronage of the Academy. At the first lecture in 1905, Dr. C. L. Dana, President of the Academy, formally introduced the Society to New York. Thus there was, from the beginning, a relationship between the Harvey Society and the Academy. At the present time a Harvey Society lecture forms the program each month at a stated Academy meeting, and throughout its notable history the society has brought before New York audiences the leaders in the medical sciences. It has been a powerful force in advancing medical

education and in adding to the prestige of the Academy. Dr. Lusk was one of the small group which under the leadership of Dr. S. J. Meltzer established the Society for Experimental Biology and Medicine. This like the Harvey Society was originally an independent organization. It has become a national society with branches in different sections of the country but the New York branch is affiliated with the Academy and its monthly meetings are held at the Academy building.

In addition to these activities, Dr. Lusk encouraged young men planning a clinical career to work in his laboratory. Many took advantage of this to their great profit and three of them later became Professors of Medicine, Dr. Du Bois at Cornell, Dr. Barr at St. Louis and Dr. McCann at Rochester. In these and other ways Dr. Lusk although not a medical man himself, exerted a powerful influence in hastening the remarkable development of clinical medicine which has occurred in this country during the past twenty five years.

Dr. Lusk exerted a wide influence in other fields than those mentioned. He was one of the founders of the Society of Biological Chemists of which he served as President. He was Scientific Director of the Russel Sage Institute of Pathology. During the World War he served as a member of the Inter-allied Scientific Food Commission and his expert knowledge of nutrition was put to good purpose. His book on the Elements of the Science of Nutrition, first published in 1906 has gone through a number of editions and is accepted as the standard text in this subject. His research work on problems of metabolism and especially on diabetes stands out as especially noteworthy and he was recognized as the American authority along these lines.

Many honors came to Dr. Lusk. He was President of the Harvey Society, of the Society for Experimental Biology and Medicine, of the Society of Physiological Chemists. He was a member of the National Academy of Sciences, of the Royal Society of London, and the Royal Society of Edinburgh, and honorary member of a number

of foreign scientific societies. He received the honorary degree of Sc.D. from Yale, L.L.D. from the University of Glasgow and M.D. from the University of Munich.

On those who had the privilege of knowing Graham Lusk his character made a lasting impression. He was of a genuinely friendly nature and had a great attraction for young men. Those men whom he accepted as friends he believed in implicitly and without reservations. He was an idealist in science and without fear in expressing his convictions. His rugged honesty, his courageousness, his loyalty to his ideals and his great personal charm, these with his scientific attainment stamped him as a rare person.

GEORGE B. WALLACE

DEATHS OF FELLOWS OF THE ACADEMY

FRANK BILLINGS, M.D., 1550 N. State Parkway, Chicago, Illinois; graduated in medicine from Northwestern University, Chicago, in 1881; elected an Honorary Fellow of the Academy November 18, 1926; died, September 21, 1932. Dr. Billings was internationally known for his work in the advancement of medicine. From 1898 to 1924 he was Professor of Medicine in Rush Medical College and the University of Chicago. He joined the Medical Reserve Corps in 1908 and in the World War served in the A. E. F. and in the Surgeon General's office as head of the Division of Physical Reconstruction. He was Chairman of the American Red Cross Mission to Russia in 1917. He was President of the American Medical Association from 1902 to 1904, of the Association of American Physicians, of the National Association for the Study and Prevention of Tuberculosis, and of the Chicago Medical Society.

PETER AUGUSTINE CALLAN, M.D., 156 Park Avenue, Yonkers, N. Y.; Graduated in medicine from the University Medical College of New York City in 1867; elected a Fellow of the Academy November 1, 1888; died, October 4, 1932. Dr. Callan was a Fellow of the American College of Surgeons, a member of the American Academy of Ophthalmology, a member of the New York Society of Ophthalmology, a member of the Society of Alumni to City Hospital, and Consulting Surgeon to the New York Eye and Ear Infirmary.

RUSSELL AUBRA HIBBS, M.D., 135 East 36 Street, New York City; graduated in medicine from the University of Louisville in Kentucky, in 1890; elected a Fellow of the Academy April 6, 1899; died, September 16, 1932. Dr. Hibbs was a Fellow of the American Medical Association, a Fellow of the American College of Surgeons, a member of the County and State Medical Societies, Surgeon-in-Chief to the New York Orthopaedic Dispensary and Hospital, Consulting Orthopaedic Surgeon to Presbyterian, New York Infirmary for Women and Children, Beekman Street Hospital, New York, and St. John's Riverside Hospital, Yonkers.

EUGENE KLEIN, M.D., 1129 Park Avenue, New York City; graduated in medicine from the College of Physicians and Surgeons, Columbia University, New York, in 1915; elected a Fellow of the Academy November 2, 1922; died, October 2, 1932. Dr. Klein was a Fellow of the American Medical Association, a member of the Society of Alumni to Mount Sinai Hospital, and Surgical Pathologist to the Bronx Hospital, New York.

DEAS MURPHY, M.D., 30 Sutton Place, New York City; graduated in medicine from Dartmouth Medical College, in 1896; elected a Fellow of the Academy May 5, 1910; died, July 15, 1932. Dr. Murphy was a member of the County and State Medical Societies.

NEWTON BOOTH WALLER, M.D., 53 East 82 Street, New York City; graduated in medicine from the medical department of the University of California, in 1896; elected a Fellow of the Academy December 3, 1908; died, October 12, 1932. Dr. Waller was a Fellow of the American Medical Association, and a member of the County and State Medical Societies.

1932

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